Developing in-house electronic nose for adulteration detection of Jasmine rice

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Jasmine rice or Thai Hom Mali rice is well-known for its special texture, flavor and fragrance. It is the most expensive and in high demand type of rice because of its distinctive properties. Adulteration of Thai Hom Mali rice by low quality rice is done by some rice sellers either for the extra financial gain or to reduce the selling price. Different proportions of jasmine rice and other kind of rice are classified into 3 groups: excellent (95%), good (85%), and normal grade (70%). Since the jasmine rice provides the unique aroma, the method for discrimination of mixed rice between jasmine rice and lower grade of rice such as white rice using electronic nose was proposed in this work. To measure the volatile organic compounds in rice sample, this In-House product was constructed with five inexpensive commercial gas sensors including temperature sensor. The designed Graphical User Interface (GUI) software which is programmed by LabVIEW was utilized to facilitate the collection and analysis of the obtained signals. Some parameters of each signal such as maximum, minimum, and slope were calculated using multivariate analysis: Principal Component Analysis (PCA) and Cluster Analysis (CA). The result demonstrated that the constructed electronic nose can identify not only 100% Jasmine rice and white rice but also classify the various percentages of Jasmine rice correctly.

Keywords: Jasmine rice; Electronic nose; Principal component analysis (PCA); Cluster analysis (CA)